

CLAIMS:

1. A probe array for an imaging system for examining an object comprising at least one emitter for emitting radiation, a plurality of detectors for detecting radiation and means for directing radiation emitted by the at least one emitter to the object and for directing radiation reflected from the object to at least two of the plurality of detectors wherein in use the emitted radiation is scanned across the object.
2. A probe array as claimed in claim 1 wherein the at least one emitter comprises a frequency conversion member which is configured to emit radiation of the desired frequency in response to irradiation by radiation of a different frequency.
3. A probe array as claimed in claim 1 wherein the at least one emitter and plurality of detectors are photoconductive devices.
4. A probe array as claimed in Claim 1 wherein the at least one emitter is configured to emit radiation having at least one frequency in the range 25GHz to 100THz.
5. A probe array as claimed in any preceding claim wherein the at least one emitter is configured to emit pulses of radiation having a plurality of frequencies, at least one of said frequencies being in the range from 25 GHz to 100THz.
6. A probe array as claimed in any preceding claim wherein the array further comprises means for raster scanning the emitted radiation.
7. A probe array as claimed in any preceding claim wherein the array comprises a single central emitter surrounded by the plurality of detectors.
8. A probe array as claimed in Claim 7 wherein the plurality of detectors are directed towards a point such that in use the object is located at this point.
9. A probe array as claimed in either Claim 7 or 8 wherein the central emitter directs the emitted radiation into a directed beam.

10. A probe array as claimed in any of claims 1 to 5 wherein the array comprises a substantially equal number of emitters and detectors.
11. A probe array as claimed in Claim 10 wherein the array is formed into a two dimensional array of emitters and detectors.
12. A probe array as claimed in Claim 10 wherein the array is formed into a one dimensional stack of interleaved emitters and detectors.
13. A probe array as claimed in Claim 12 wherein the emitters are arranged in use to form an extended focus of emitted radiation substantially parallel to the array.
14. A probe array as claimed in Claims 12 or 13 wherein the array is raster scanned by linear translation of the stack.
15. A probe array as claimed in Claims 12 or 13 wherein the array is raster scanned by rotation about an axis through the stack of emitters and detectors.
16. A probe array as claimed in any of Claims 12 to 15 wherein each emitter and detector is mounted within a self contained housing module.
17. A probe array as claimed in Claim 16 wherein each module is capable of forming a stack with similar modules.
18. A probe array as claimed in any preceding claim wherein only a proportion of the total number of emitters and detectors are in use at any given time.
19. A probe array as claimed in any of claims 2 to 18 wherein the array further comprises a lens array to focus the irradiating radiation onto the at least one emitter and plurality of detectors.
20. A probe array as claimed in any of claims 2 to 19 wherein the irradiating radiation is supplied by means of a number of optical fibres.
21. A probe array as claimed in Claim 20 wherein a separate optical fibre supplies irradiating radiation to a single emitter/detector.

22. A probe array as claimed in either of claims 20 or 21 when dependent on claim 18 wherein the lens array is located between the optical fibres and the at least one emitter and plurality of detectors.
23. A probe array as claimed in any of claims 2 to 22 wherein the array further comprises a THz transmitting array to couple in or out any THz radiation.
24. A probe array as claimed in Claim 23 wherein the THz transmitting array is constructed from any of the following; polythene, polypropylene, silicon, alumina, aluminium, aluminium nitride, aluminium carbide, silicon nitride, germanium, paraffin-wax or any other suitable polymer, ceramic or semiconductor.
25. An imaging system for examining an object comprising a probe array as claimed in any preceding claim and signal processing means for analysing the radiation detected by the probe array.
26. An imaging system for examining an object as claimed in Claim 25 when dependent on any of claims 2 to 24 further comprising a source of e/m radiation for irradiating the probe array.
27. An imaging system as claimed in Claim 26 wherein the source provides a beam of radiation and the system further comprises a series of beam-splitters and fibre couplers, each beam-splitter being arranged to couple a proportion of the beam of radiation via a fibre coupler into an optical fibre such that in use the optical fibre irradiates the probe array.
28. An imaging system as claimed in Claim 26 wherein the source provides a beam of radiation and the system further comprises a lensing array, the array being arranged in use to couple a proportion of the beam into an optical fibre such that the fibre irradiates the probe array.
29. An imaging system as claimed in any of claims 25 to 28 wherein the probe array is configured as a hand-held unit and the source and signal processing means are housed in a base unit, the hand-held unit and base unit being connected via optical fibre.

30. A method of examining an object, the method comprising:

emitting a beam of radiation from at least one emitter, said emitted radiation being in the THz frequency range;

directing the emitted radiation to irradiate an object

directing radiation reflected from the object into some or all of a plurality of detectors

wherein the emitted radiation is raster scanned across the object to be examined.

31. A probe array as herein described with reference to any of the accompanying drawings.

32. An imaging system as herein described with reference to any of the accompanying drawings.

33. A method of examining an object as herein described with reference to any of the accompanying drawings.